

COM-Companies-SOP-IR-1

Page 16, T&D System Impacts: Provide all summaries, studies, reports, or other documentation detailing the problems for customers and utilities with initial installations of small-scale DG units at customers' sites.

HECO Response:

The Companies object to the request that they provide “all summaries, studies, reports, or other documentation” on the grounds that the request (1) is overly broad and unduly burdensome, (2) would encompass documents that are privileged under the Attorney-Client Privilege and/or Attorney Work Product Privilege, (3) would encompass documents that contain confidential customer information, and (4) would encompass documents that are subject to Protective Orders in Docket No. 02-0051 (consolidated) (Interconnection Reports) and Docket No. 99-0207 (Rider A-Standby Service Report). Without waiving these objections, please see response to CA-SOP-IR-16.

COM-Companies-SOP-IR-2

Page 17, Lost Revenue: Provide any mathematical examples prepared by the Utility of how utility ownership reduces the loss of fixed costs, and allows the structure of costs so that all parties are better off.

HECO Response:

Please see HECO Response to CA-SOP-IR-17. The Companies' proposed CHP Program application, Docket No. 03-0366, would allow the Companies to retain some of the kWh sales that would have been lost to 3<sup>rd</sup> party CHP, thereby reducing the loss of fixed costs contribution. Please see the Companies CHP Program application, Workpaper H, pages 14, 37, and 54, for the impact of 3<sup>rd</sup> party CHP on HECO, HELCO and MECO retained kWh sales, respectively.

COM-Companies-SOP-IR-3

Page 19, DG Diversity Studies: Provide any analysis done by HECO or MECO on the number and/or size of Distributed Generation ("DG") units required to "create diversity" or how that diversity benefit would be measured.

HECO Response:

HECO and MECO do not have specific analyses on the number and/or size of DG units that would be required to create diversity or how that diversity benefit would be measured. However, diversity can be illustrated conceptually by the following example. If there is a single DG on a circuit to serve a particular load, there will be times when that DG will be unavailable due to a planned or forced outage. In this case, there is no diversity and the grid must provide backup to the DG, in which case the need for firm system capacity would not be deferred. If there are multiple DGs on that circuit, there may still be times when the combined output of the DGs may be zero due to a combination of planned and forced outages. However, the probability of the combined output being zero is reduced. That probability will be a function of the number of DGs, the DG unit sizes, their planned outage requirements and their forced outage rates. The probability of serving the demand on the circuit could probably be calculated in a manner that would be the complement of the more commonly calculated Loss of Load Probability (LOLP) to estimate generating system reliability. For an explanation of the LOLP calculation, please see HECO's response to CA-IR-1 filed on May 14, 2003 on HECO's Adequacy of Supply letter of January 31, 2003.

COM-Companies-SOP-IR-4

Page 20, DG Distribution System Benefits: Is it required that DG units be located "at" targeted substations to increase reliability, or merely be connected to circuits served by those substations? Provide any relevant articles and analysis regarding this issue.

HECO Response:

DG units can still increase the reliability of service to the customer even if the unit is not located at targeted substations. Page 13, Issue No. 3 of HECO's Preliminary Statement of Position recognizes that DG units can be used in a variety of roles, which the Company is considering such as 1) customer-sited emergency generation, 2) substation-sited peaking generation, 3) substation-sited generation to address case-specific T&D problems and 4) customer-sited CHP systems. As stated on page 16, Issue No. 4 of HECO's Preliminary Statement of Position, the impact of distributed generation on Hawaii's transmission and distribution system is very complex and requires detailed studies on a case-by-case basis.

Analysis of distributed generation at the Hana Substation was provided in MECO's IRP-2 report filed with the Commission on March 31, 2000.

COM-Companies-SOP-IR-5

Page 20, Radial vs. Network Benefits of DG: Provide a list of communities and subcommunities on Maui served by radial distribution lines.

HECO Response:

All distribution circuits on Maui are served by radial distribution lines.

COM-Companies-SOP-IR-6

Page 21 DG Lost Margins: Provide the underlying analysis supporting the statement that DG benefits would be "generally more than offset" by the utility's revenue loss.

HECO Response:

Please see the Companies' CHP Program, Docket No. 03-0366, Section VIII, CHP Program Economic Analysis, pages 51-61, and Exhibit H.

COM-Companies-SOP-IR-7

Page 21, Avoided Utility System Costs: Provide any studies done on the MECO system that identify potential transmission or central station costs that could be avoided through targeted DG.

HECO Response:

Please refer to the Companies' CHP Program application, filed October 10, 2003, in Docket No. 03-0366 with respect to avoidable central station generation costs. In particular, refer to the following sections pertaining to the economic analysis and avoided costs from CHP (though not necessarily targeted CHP):

- Section VIII (CHP Program Economic Analysis), pages 51 to 61;
- Exhibit A, pages 5 and 6 (Maui CHP Forecast);
- Exhibit B, CHP Systems, Annual Capacity and Capital Costs;
- Exhibit H, pages 13 –16 (MECO Cost-Benefit Analysis). Workpaper H, filed on November 13, 2003, provides supporting information for Exhibit H – see pages 40 to 42 of Workpaper H for the avoided cost calculations for MECO.

See response to COM-Companies-SOP-IR-4 regarding potential transmission costs that might be avoided through targetted DG.

COM-Companies-SOP-IR-8

Page 21, Avoided Utility System Costs: Provide any studies done by MECO regarding the transmission and/or distribution cost savings that would result from any specific DG proposals made by the Company or its customers in the last four years.

HECO Response:

The attached cost saving analysis was provided in MECO's IRP-2 report filed with the PUC on May 31, 2000, in Docket No. 99-0004. Please see pages 2-3 of this IR response.



#### **8.4.4.5 Distributed Generation and the Iniki Plan**

As discussed previously in Section 7.4, distributed generation was screened out as a supply-side resource option because of the project-specific nature of its benefits. A very good example of this is MECO's Hana standby generation project. This project involves the relocation of two diesel engine generators from the Lanai City Power Plant to Hana Substation No. 41 in order to provide standby electric service to the Hana community during planned service outages resulting from the maintenance or unplanned power outages of the single transmission line to Hana.

The cost and benefits specific to this project are identified in MECO's Capital Project Expenditure Application for the "Relocation of Lanai City Units L7 & L8 to Hana Substation", in PUC Docket No. 99-0369. Hana receives power through a distribution substation (No. 41), which is fed by a single radial 23-kV transmission line. This single transmission line is over 35 years old and has shown to be a weakness in the Hana area system reliability. Whenever this single transmission line is out of operation, whether due to planned maintenance or unplanned outages, the customers in Hana are unable to receive power from MECO. Repair and maintenance of the transmission line is often difficult because many sections of the line are in rugged terrain that is difficult to access. In 1998, there were 11 unscheduled and scheduled outages affecting the Hana substation, which resulted in service interruptions to Hana customers of almost 63 hours. In 1999 (as of October 14, 1999), there were three outages affecting the Hana substation, which resulted in service interruptions of almost 12 hours.

The traditional method to improve reliability would be the installation of additional transmission lines. One transmission line alternative is to install a 35-mile redundant single circuit on steel poles from the Kanaha substation, located near Kahului, to the Hana substation in the existing transmission corridor. The estimated cost for the single circuit is approximately \$20,200,000. If a double circuit is installed instead of a single circuit, the estimated cost increases to approximately \$30,000,000. The use of wood poles instead of steel poles would not significantly reduce the estimated costs. Although the material cost per wood pole is less, the cost of the poles is only a small percentage of the total project cost. Also, more wood poles would be required for the same 35-mile route. In this case, the distributed generation units are a cost-effective option.

Transfer of the two existing Lanai City Power Plant diesel engine generators at an estimated capital cost of \$747,000 provides an opportunity to quickly improve reliability at a cost significantly lower than the transmission line alternative. In addition, utilization of the Lanai City Power Plant diesel engine generators as opposed to purchasing new units results in estimated cost savings of over \$500,000 (additional cost of new units partially offset by refurbishment and transportation costs of L7 & L8).

Relocation of Lanai City PP Units L7 & L8 to Hana for use as standby generation will increase the reliability of electrical service to MECO's customers in the Hana community. These units will provide power to the Hana community during planned maintenance or unplanned power outages of the transmission line. If these units had been available in 1998 and 1999, they may have prevented or mitigated a majority of the service interruptions to the Hana area which occurred during these timeframes. These units will also improve the level of Civil Defense readiness in the Hana area since they can be used in the event of a prolonged outage of the transmission line due to a natural disaster.

These units are not intended to generate energy at the Hana Substation on a regular basis, therefore, the two 1MW units are not counted in Maui's total generating unit capability. The reasons for this are: 1) these Hana units are intended to operate during planned or unplanned outages of the transmission line; 2) these units do not have automatic start and remote control capability; 3) the remote location of Hana and its limited fuel storage capability would make fuel delivery a problem under daily dispatch; 4) the operating air permit for the Hana units limits its operation to about 1,565 hrs per year at full load; and 5) since the Hana units will not have a dedicated maintenance staff, maintenance would be more difficult and costly if dispatched daily.

This project demonstrates the need for specific data on the technology and assumptions of a project to properly evaluate the cost and benefits of distributed generation. Without such details, the potential costs and benefits would be conceptual and hypothetical, making it difficult to form any meaningful conclusions. Therefore, distributed generation as a supply-side resource option was screened out and not carried forward to the development of the finalist plans and integration phases. MECO recognizes that there is considerable interest in the potential benefits from distributed generation even though project-specific data is very limited or not available. Without

COM-Companies-SOP-IR-9

Page 21, Avoided Utility System Costs: Provide a complete copy of the current MECO line extension policy as it applies to a developer of a new residential condominium, including any analysis of the linkage between the line extension charges and the marginal cost of new transmission and distribution capacity discussed in question (13) above. To enhance practical understanding of the line extension policy, provide at least two examples of calculations under that line extension policy, at least one of which required the developer to make a contribution in aid of construction or customer advance in order to obtain service from MECO. The names of the actual customers may be deleted for privacy.

HECO Response:

Please find attached MECO's tariff, "Rule No. 13, Line Extensions". Rule 13 specifies the requirements for providing line extensions to connect a customer to the system, including the determination of the customer advance and/or customer contribution required from the customers. The costs that are provided under this Rule that are used to determine the required customer advance reflect the estimates of the line extension costs of connecting the specific applicants to the system.

The company prepares marginal cost study for rate case purposes. The marginal distribution costs is based on costs of load-growth related system distribution plant costs for the study period which normally spans at least 10-years and include historical (recorded) and future (forecasted) years. The cost data for the historical periods covered in the study period include the recorded line extension costs provided under Rule 13. The estimates of the costs data for the future years covered in the study period are prepared in a similar way as the estimates provided under Rule 13. MECO's latest marginal cost study was filed in MECO's last rate case, Docket No. 97-0346. Please see HECO Response to COM-Companies-SOP-IR-12.

Also attached are two examples of the derivation of cost estimates for the customer's contribution in advance of construction.

supersedes sheet No. 28  
Effective: October 9, 1985

REVISED SHEET NO. 28  
Effective: August 18, 1994

RULE No. 13

Line Extensions

Extensions of lines necessary to furnish service to applicants for permanent service will be made by the Company in accordance with the following provision:

A. GENERAL

The Company will construct, own, operate and maintain electric lines and equipment only under, along, upon and over public streets, roads and highways where it has the legal right to do so, and on public lands and private property across which it has otherwise obtained rights of way or other necessary rights satisfactory to the Company.

B. OVERHEAD EXTENSION TO SERVE INDIVIDUAL APPLICANTS

1. Extension Allowance

- a. Overhead line extensions will be made by the Company at its expense provided the cost of the line required does not exceed sixty months' estimated revenue of the applicant. The Company will install, own, operate and maintain the necessary line transformers, meters and service drop in accordance with Rule No. 14 at its expense, except where the customer requests special facilities.
- b. Special Facilities: The Company will install only those facilities which it deems necessary to render service in accordance with the tariff. Where the applicant requests facilities which are acceptable to the Company but are in addition to, or in substitution for, the standard facilities which the Company normally would install, the applicant shall make a contribution of the extra cost thereof.

2. Extensions Beyond Allowance

For overhead line extensions whose estimated cost exceeds the sixty months' estimated revenue, the applicant shall make an advance equal to the difference between the estimated line cost and the sixty months' estimated revenue. The estimated line cost will be exclusive of line transformers, service drops and meters, and will be based on the route determined by the Company.

3. Refunds

- a. If, within five years from the date service is first rendered, new permanent customers or additional permanent loads are added to the line for which an advance was made, a refund will be made to the customers who made the original advance equal to the line extension allowance for the new permanent customers or loads applicable to the line

MAUI ELECTRIC COMPANY, LIMITED

Supersedes Sheet No. 29  
Effective: October 9, 1985

REVISED SHEET NO. 29  
Effective: August 18, 1994

MAUI ELECTRIC COMPANY, LTD

RULE NO. 13 (Continued)  
Line Extensions

constructed with the advance, in the amount of the residual from the extension allowance over the cost of the line extension for the new permanent customer or additional permanent load. Such refund shall be credited sequentially from the new permanent customer's or load's point of service toward the source of supply and shall be applicable only to that section of line used for the new customer or load. In no case shall the refund exceed the advance for that section of line. No interest will be paid on these advances.

- b. For Molokai Division, the refunds due to individual applicants whose line extensions were provided before August 18, 1994 shall be made in accordance with Molokai Division's Rule 13 which became effective August 26, 1980 per PUC D&O No. 6346.

C. OVERHEAD EXTENSION TO SUBDIVISION OR DEVELOPMENTS

1. Advances

Overhead line extensions to and/or in subdivisions or developments will be constructed, owned and maintained by the Company prior to applications for service by the ultimate customers when the developer or subdivider makes an advance of the entire estimated cost of the line extension. The company may postpone for one year collecting that part of the advance which it estimates would be refunded during the year on the basis of sixty months' revenue from permanently connected customers.

2. Refunds

Refunds will be made to the developer or subdivider making the advance when permanent customers within the subdivision are connected to the lines based on the estimated revenues for sixty months from such permanent customers in the subdivision. If permanent customers within the subdivision require line extension from the existing lines within the subdivision, such permanent customers shall be considered as individual applicants under Rule 13 (B) herein and entitled to the extension allowance in computing any advance that may be due. The developer or subdivider shall only be entitled to a refund in the amount of a permanent customer's extension allowance less the cost of the line extension to serve such permanent customer and shall not be entitled to any credits for individual line extension requests where the permanent customer is required to make an advance payment to the utility. The total amount to be refunded is limited to the amount of the advance made by the developer or subdivider and no refund will be made after five years from the date of the advance. No interest will be paid on these advances made by the developer or subdivider.

MAUI ELECTRIC COMPANY, LIMITED

Supersedes Sheet No. 30  
Effective: October 9, 1985

REVISED SHEET NO. 30  
Effective: August 18, 1994

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RULE NO. 13 (Continued)  
Line Extensions

The developer or subdivider shall not be entitled to any refund from permanent customers attaching to the line outside of the subdivision boundaries including another subdivision that may connect to the line to which the first developer or subdivider contributed an advance to the utility. Each developer or subdivider will be subject to Rule 13 (C) and the advance requirements thereto.

For Molokai Division, developers and subdividers whose line extensions were provided before August 18, 1994 shall receive refunds in accordance with Molokai Division's Rule 13 which became effective August 26, 1980 per PUC D&O No. 6346.

D. UNDERGROUND EXTENSIONS

1. General

The Company will install its distribution system underground only when the customer, developer or subdivider makes a contribution of the estimated difference between the cost of the underground system and an equivalent overhead system, or when for engineering and operating reasons the Company may install the system underground at its own expense. The type of underground system that will be installed under this rule shall meet engineering construction standards of the Company. In all cases, the Company will own, operate and maintain the underground facilities.

2. Extensions to Serve Individual Applicants

Underground extensions will be installed by the Company provided the applicant makes a contribution of the difference between the estimated underground extension cost and estimated equivalent overhead extension cost. The overhead equivalent cost allowed is subject to the limitations and conditions of paragraph B of this rule. When feasible, the applicant will provide the trenching, backfill and necessary duct work to meet engineering construction standards of the Company.

3. Extensions to and/or within Subdivisions or Development in Advance of Applications for Service by the Ultimate User

Underground lines will be installed by the Company in a subdivision or development prior to applications for service from the ultimate customer when the subdivider or developer makes a contribution equal to the difference between the estimated cost of the underground system and the estimated cost of an equivalent overhead system. The allowance for the overhead costs are subject to the limitations and conditions of paragraph C of this rule. When feasible the subdivider or developer will furnish the trenching, duct work, backfill and miscellaneous construction to meet engineering construction standards of the Company.

MAUI ELECTRIC COMPANY, LIMITED

SHEET NO. 30A  
Effective: August 18, 1994

MAUI ELECTRIC COMPANY, LTD

RULE NO. 13 (Continued)  
Line Extensions

4. Replacement of Overhead with Underground Facilities

When mutually agreed upon by the customer or applicant and the Company, overhead facilities will be replaced with underground facilities, provided the customer or applicant requesting the change makes a contribution of the estimated cost installed of the underground facilities less the estimated net salvage of the overhead facilities removed.

5. Special Facilities

Where the applicant requests facilities which are acceptable to the Company but are in addition to, or in substitution for, the standard facilities which the Company would normally install, the applicant shall make a contribution of the estimated extra cost thereof.

MAUI ELECTRIC COMPANY, LIMITED

COM - COMPANIES SOP-IR-9  
EXAMPLE No. 1

recap

COST ESTIMATE RECAP SHEET

Project: \_\_\_\_\_ Date: 8/30/2002

By: \_\_\_\_\_ Approved: \_\_\_\_\_

SUPERVISOR'S RATING: \_\_\_\_\_

ACCOUNT	UNDERGROUND	OVERHEAD
Estimated Cost of Material, Labor, Transp. & Engineering	65,030.26	45,154.20
Service Connection Cost in Public R/W	0.00	0.00
Transformer Price Difference (Includes Material Overhead)	(3,014.15)	0.00
<b>TOTAL COST</b>	<b>62,016.11</b>	<b>45,154.20</b>
Less Credit for Equivalent Overhead	45,154.20	
Subtotal	16,861.91	
GE Tax 4.17%	702.47	
	<u>17,564.38</u>	
271 Non-refundable Contribution in Aid of Construction		
Total Overhead Credit from Above		** 45,154.20
Total Overhead Cost (Other than Credit)		0.00
Less OH Service Costs in Public R/W		0.00
Less 60 Months Estimated Revenue		<u>2,562,973.80</u>
	Subtotal	0.00
	GE Tax 4.17%	<u>0.00</u>
252 Amount Applicable for Refundable Advance for Construction		0.00
<b>TOTAL CUSTOMER'S CONTRIBUTION AND ADVANCE</b>		<u><u>17,564.38</u></u>
<b>TOTAL COST (From Above)</b>	<b>62,016.11</b>	<b>45,154.20</b>
Less Transformer Price Difference	(3,014.15)	0.00
Add Service Costs in Public R/W (OH only) & J.P. Credits	0.00	8,075.00
<b>AUTHORIZATION AMOUNT (If Applicable—\$20,000)</b>	<b>65,030.26</b>	<b>53,229.20</b>
	702	702

\*\* The Total U.G. Cost amount should be applied here if it is LESS than the OH figure.



MECO ESTIMATE

Date: 9/30/2002  
Time: 8:01 AM

Overhead  
XX Underground

By:

Approved:

Req No.: M0001653

Supervisor's Rating:

Project Name:

INSTALLATION

Direct Material	34,845.48		
Indirect Material	5,226.82	15.00	%
Construction Labor	4,418.76		
Indirect Labor	4,418.00	32.00	\$/hour
Construction Transportation	0.00	0.00	\$/hour
Outside Material	0.00	15.00	%
Contract Services (1&2)	250.00		
Subtotal	49,157.06		
Engineering (3)	5,893.20	32.74	\$/hour
Engineering Overheads	8,000.00	50.00	\$/hour
Engineering Transportation	0.00	0.00	\$/hour
J.P. Installation Cost from H.T. Co.	0.00		
Total Installation Cost			64,050.26

REMOVAL

Construction Labor	0.00		
Indirect Labor	0.00	32.00	\$/hour
Construction Transportation	0.00	0.00	\$/hour
Subtotal	0.00		
Engineering	0.00	32.74	\$/hour
Engineering Overheads	0.00	50.00	\$/hour
Engineering Transportation	0.00	0.00	\$/hour
Total Removal Cost			0.00
J.P. Removal Cost from H.T. Co.			0.00

Payroll Tax 980.00

TOTAL INSTALLATION & REMOVAL COST 65,030.26  
(Based on Labor Rates as of 11/1/00)

Less:

Joint Pole Credit	0.00	Use this value with RECAP
Salvage Credit	0.00	
Depreciation Credit	0.00	
60 Month Revenue Credit	0.00	
Total Credit	0.00	

NET TOTAL

Cost Escalation 2.60 %

Sub Total	65,030.26	Use this value with RECAP
GE Tax 4.17%	2,709.18	
	67,739.42	
	1,690.79	
Sub Total	68,721.05	Use this value with RECAP
GE Tax 4.17%	2,779.60	
	69,500.65	

NET TOTAL WITH ESCALATION

(1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs  
Form: 11/24/86  
REV 5/3/02

MECO ESTIMATE

Date: 9/30/2002  
Time: 8:28 AM

XX Overhead  
Underground

By:

Approved:

Req No.: M0001653

Supervisor's Rating:

Project Name:

INSTALLATION

Direct Material	6,309.14		
Indirect Material	946.37	15.00	%
Construction Labor	5,587.49		
Indirect Labor	5,584.00	32.00	\$/hour
Construction Transportation	0.00	0.00	\$/hour
Outside Material	0.00	15.00	%
Contract Services (182)	4,043.00		
Subtotal	22,470.00		
Engineering (3)	5,893.20	32.74	\$/hour
Engineering Overheads	9,000.00	50.00	\$/hour
Engineering Transportation	0.00	0.00	\$/hour
J.P. Installation Cost from H.T. Co.	0.00		
Total Installation Cost			37,363.20

REMOVAL

Construction Labor	0.00		
Indirect Labor	0.00	32.00	\$/hour
Construction Transportation	0.00	0.00	\$/hour
Subtotal	0.00		
Engineering	0.00	32.74	\$/hour
Engineering Overheads	0.00	50.00	\$/hour
Engineering Transportation	0.00	0.00	\$/hour
Total Removal Cost			0.00
J.P. Removal Cost from H.T. Co.			0.00

Payroll Tax 1081.00

TOTAL INSTALLATION & REMOVAL COST 38,464.20  
(Based on Labor Rates as of 11/1/00)

Less:

Joint Pole Credit	8,075.00	Use this value with RECAP
Salvage Credit	0.00	
Depreciation Credit	0.00	
60 Month Revenue Credit	0.00	
Total Credit	8,075.00	

Sub Total 30,379.20 Use this value with RECAP

14,775.00 Use this value with RECAP

GE Tax 4.17% 1,881.12

47,035.32

Three Pole Structure (see attached)

NET TOTAL

Cost Escalation 2.80 %

789.86

Sub Total 31,169.08 Use this value with RECAP

14,775.00 Use this value with RECAP

GE Tax 4.17% 1,914.03

47,858.09

Three Pole Structure (see attached)

NET TOTAL WITH ESCALATION

(1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs  
Form: 11/24/88  
REV 5/3/02

COM-COMPANIES-SOP-IR-9  
EXAMPLE NO. 2

recap

## COST ESTIMATE RECAP SHEET

Date: 3/17/2003

Project:

By:

SUPERVISOR'S RATING: \_\_\_\_\_

Approved: \_\_\_\_\_

## ACCOUNT

## UNDERGROUND

## OVERHEAD

Estimated Cost of Material, Labor, Transp. &amp; Engineering

9,095.68

5,287.49

Service Connection Cost in Public R/W

0.00

0.00

Transformer Price Difference (Includes Material Overhead)

7,221.68

0.00

TOTAL COST

16,317.34

5,287.49

Less Credit for Equivalent Overhead

5,287.49

Subtotal

11,029.85

GE Tax 4.17%

459.50

271 Non-refundable Contribution in Aid of Construction

11,489.35

Total Overhead Credit from Above

\*\*

5,287.49

Total Overhead Cost (Other than Credit)

0.00

Less OH Service Costs in Public R/W

0.00

Less 60 Months Estimated Revenue

529,557.00

Subtotal

0.00

GE Tax 4.17%

0.00

252 Amount Applicable for Refundable Advance for Construction

0.00

TOTAL CUSTOMER'S CONTRIBUTION AND ADVANCE

11,489.35

TOTAL COST (From Above)

16,317.34

5,287.49

Less Transformer Price Difference

7,221.68

0.00

Add Service Costs in Public R/W (OH only) &amp; J.P. Credits

0.00

0.00

AUTHORIZATION AMOUNT (If Applicable—\$20,000)

9,095.68

5,287.49

460

460

\*\* The Total U.G. Cost amount should be applied here if it is LESS than the OH figure.

MECO ESTIMATE

Date: 3/17/2003  
Time: 10:01 AM

Overhead  
XX Underground

By: ~~XXXXXXXXXX~~

Approved: ~~XXXXXXXXXX~~

Project Name: ~~XXXXXXXXXXXXXXXXXXXX~~

Req No.: M0010401

Supervisor's Rating: \_\_\_\_\_

INSTALLATION

Direct Material.....	2,454.92		
Indirect Material.....	270.04	11.00	%
Construction Labor.....	1,087.84		
Indirect Labor.....	1,401.60	43.80	\$/hour
Construction Transportation.....	0.00	0.00	\$/hour
Outside Material.....	0.00	11.00	%
Contract Services (1&2).....	0.00		
Subtotal.....	5,194.40		
Engineering (3).....	1,400.08	31.82	\$/hour
Engineering Overheads.....	2,279.20	51.80	\$/hour
Engineering Transportation.....	0.00	0.00	\$/hour
J.P. Installation Cost from H.T. Co.....	0.00		
Total Installation Cost.....		8,873.68	

REMOVAL

Construction Labor.....	0.00		
Indirect Labor.....	0.00	43.80	\$/hour
Construction Transportation.....	0.00	0.00	\$/hour
Subtotal.....	0.00		
Engineering.....	0.00	31.82	\$/hour
Engineering Overheads.....	0.00	51.80	\$/hour
Engineering Transportation.....	0.00	0.00	\$/hour
Total Removal Cost.....		0.00	
J.P. Removal Cost from H.T. Co.....		0.00	
Payroll Tax.....		222.00	
TOTAL INSTALLATION & REMOVAL COST (Based on Labor Rates as of 11/1/00)		9,095.68	

Less:

Joint Pole Credit.....	0.00	Use this value with RECAP
Salvage Credit.....	0.00	
Depreciation Credit.....	0.00	
60 Month Revenue Credit.....	0.00	
Total Credit.....	0.00	

NET TOTAL

Cost Escalation..... 2.60 %

Sub Total	9,095.68	Use this value with RECAP
GE Tax 4.17%	378.93	
	9,474.61	
238.49		
Sub Total	9,332.17	Use this value with RECAP
GE Tax 4.17%	388.78	
	9,720.95	

NET TOTAL WITH ESCALATION

(1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs  
Form: 11/24/88  
REV 2/3/03

MECO ESTIMATE

Date: 3/17/2003  
Time: 10:02 AM

XX. Overhead  
Underground

By: \_\_\_\_\_

Approved: \_\_\_\_\_

Req No.: M0010401

Supervisor's Rating: \_\_\_\_\_

Project Name: \_\_\_\_\_

INSTALLATION

Direct Material .....	540.55		
Indirect Material .....	59.49	11.00 %	
Construction Labor .....	367.07		
Indirect Labor .....	481.80	43.80 \$/hour	
Construction Transportation .....	0.00	0.00 \$/hour	
Outside Material .....	0.00	11.00 %	
Contract Services (1&2) .....	0.00		
Subtotal .....	1,449.21		
Engineering (3) .....	1,400.08	31.82 \$/hour	
Engineering Overheads .....	2,279.20	51.80 \$/hour	
Engineering Transportation .....	0.00	0.00 \$/hour	
J.P. Installation Cost from H.T. Co. ....	0.00		
Total Installation Cost .....			5,128.49

REMOVAL

Construction Labor .....	0.00		
Indirect Labor .....	0.00	43.80 \$/hour	
Construction Transportation .....	0.00	0.00 \$/hour	
Subtotal .....	0.00		
Engineering .....	0.00	31.82 \$/hour	
Engineering Overheads .....	0.00	51.80 \$/hour	
Engineering Transportation .....	0.00	0.00 \$/hour	
Total Removal Cost .....			0.00
J.P. Removal Cost from H.T. Co. ....			0.00

Payroll Tax .....

TOTAL INSTALLATION & REMOVAL COST  
(Based on Labor Rates as of 11/1/00)

Less:

Joint Pole Credit .....	0.00	Use this value with RECAP
Salvage Credit .....	0.00	
Depreciation Credit .....	0.00	
60 Month Revenue Credit .....	0.00	
Total Credit .....	0.00	

NET TOTAL

Cost Escalation .....

NET TOTAL WITH ESCALATION

Sub Total	5,287.49	Use this value with RECAP
GE Tax 4.17%	220.28	
	5,507.77	
	137.47	
Sub Total	5,424.97	Use this value with RECAP
GE Tax 4.17%	228.00	
	5,650.97	

(1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs  
Form: 11/24/98  
REV 2/3/03

COM-Companies-SOP-IR-10

Page 21, Avoided Utility System Costs: Provide a complete copy of the current MECO line extension policy as it applies to a developer of a new Schedule P hotel or commercial structure, including any analysis of the linkage between the line extension charges and the marginal cost of new transmission and distribution capacity discussed in question (13) above. To enhance practical understanding of the line extension policy, provide at least two examples of calculations under that line extension policy. If any Schedule P customer connections in the past four years required the developer to make a contribution in aid of construction or customer advance in order to obtain service from MECO, provide the line extension study or studies. If such line extension study cannot be provided, provide two example line extension studies that did not trigger a developer contribution. The names of the actual customers may be deleted for privacy.

HECO Response:

Please see response to COM-Companies-SOP-IR-9 for MECO's tariff, "Rule No. 13, Line Extensions".

Also attached are two examples of the derivation of cost estimates for the customer's contribution in advance of construction.

COM-COMPANIES-SOP-IR-10  
EXAMPLE NO.1

recap

## COST ESTIMATE RECAP SHEET

Date: 9/8/2003

By:

Approved:

Project:

SUPERVISOR'S RATING: \_\_\_\_\_

## ACCOUNT

## UNDERGROUND

## OVERHEAD

Estimated Cost of Material, Labor, Transp. &amp; Engineering

88,253.98

67,268.75

Service Connection Cost in Public R/W

6,755.00

5,215.00

Transformer Price Difference (Includes Material Overhead)

3,893.80

0.00

## TOTAL COST

98,702.58

72,483.75

Less Credit for Equivalent Overhead

72,483.75

Subtotal

24,218.81

GE Tax 4.17%

1,008.98

271 Non-refundable Contribution in Aid of Construction

25,227.77

Total Overhead Credit from Above

72,483.75

Total Overhead Cost (Other than Credit)

0.00

Less OH Service Costs in Public R/W

5,215.00

Less 60 Months Estimated Revenue

0.00

Subtotal

67,268.75

GE Tax 4.17%

2,802.42

252 Amount Applicable for Refundable Advance for Construction

70,071.17

## TOTAL CUSTOMER'S CONTRIBUTION AND ADVANCE

95,298.94

## TOTAL COST (From Above)

98,702.58

72,483.75

Less Transformer Price Difference

3,893.80

0.00

Add Service Costs in Public R/W (OH only) &amp; J.P. Credits

0.00

5,215.00

## AUTHORIZATION AMOUNT (If Applicable—\$20,000)

93,008.98

77,698.75

1,008

1,008


\*\* The Total U.G. Cost amount should be applied here if it is LESS than the OH figure.

MECO ESTIMATE

Date: 9/5/2003  
Time: 10:45 AM

\_\_\_ Overhead  
XX Underground

By: \_\_\_\_\_

Approved: 

Req No.: M0009244

Supervisor's Rating: \_\_\_\_\_

Project Name: \_\_\_\_\_

INSTALLATION

Direct Material .....	28,996.29		
Indirect Material .....	4,059.48	14.00 %	
Construction Labor .....	17,777.87		
Indirect Labor .....	22,828.34	42.85 \$/hour	
Construction Transportation .....	0.00	0.00 \$/hour	
Outside Material .....	0.00	14.00 %	
Contract Services (1&2) .....	1,720.00		
Subtotal .....	75,381.98		
Engineering (3) .....	2,981.08	31.82 \$/hour	
Engineering Overheads .....	4,779.90	50.85 \$/hour	
Engineering Transportation .....	0.00	0.00 \$/hour	
J.P. Installation Cost from H.T. Co. ....	0.00		
Total Installation Cost .....			83,152.96

REMOVAL

Construction Labor .....	0.00		
Indirect Labor .....	0.00	42.85 \$/hour	
Construction Transportation .....	0.00	0.00 \$/hour	
Subtotal .....	0.00		
Engineering .....	0.00	31.82 \$/hour	
Engineering Overheads .....	0.00	50.85 \$/hour	
Engineering Transportation .....	0.00	0.00 \$/hour	
Total Removal Cost .....			0.00
J.P. Removal Cost from H.T. Co. ....			0.00

Payroll Tax ..... 1889.00

TOTAL INSTALLATION & REMOVAL COST  
(Based on Labor Rates as of 11/1/00) 85,021.98

Less:

Joint Pole Credit .....	0.00	Use this value with RECAP
Salvage Credit .....	0.00	
Depreciation Credit .....	0.00	
60 Month Revenue Credit .....	0.00	
Total Credit .....	0.00	

NET TOTAL

Cost Escalation ..... 2.60 %

NET TOTAL WITH ESCALATION

Sub Total	85,021.98	Use this value with RECAP
GE Tax 4.17%	3,543.01	
	88,563.92	
	2,210.57	
Sub Total	87,232.53	Use this value with RECAP
GE Tax 4.17%	3,634.11	
	90,866.64	

+1232 = 80253.96  
(PER DIEM)

- (1) Includes Easement Costs
- (2) Includes Tree Trimming Costs
- (3) Includes Land Agent Costs



MECO ESTIMATE

Date: 9/8/2003  
Time: 10:57 AM

XX Overhead (OH EQUIV)  
Underground

By: \_\_\_\_\_

Approved: \_\_\_\_\_

Project Name: \_\_\_\_\_

Req No.: M0009244

Supervisor's Rating: \_\_\_\_\_

INSTALLATION

Direct Material	9,548.81	
Indirect Material	1,336.81	14.00 %
Construction Labor	15,525.39	
Indirect Labor	19,935.95	42.85 \$/hour
Construction Transportation	0.00	0.00 \$/hour
Outside Material	0.00	14.00 %
Contract Services (1&2)	10,365.00	
Subtotal	56,711.77	
Engineering (3)	2,991.08	31.82 \$/hour
Engineering Overheads	4,779.90	50.85 \$/hour
Engineering Transportation	0.00	0.00 \$/hour
J.P. Installation Cost from H.T. Co.	0.00	
Total Installation Cost		64,482.75

REMOVAL

Construction Labor	0.00	
Indirect Labor	0.00	42.85 \$/hour
Construction Transportation	0.00	0.00 \$/hour
Subtotal	0.00	
Engineering	0.00	31.82 \$/hour
Engineering Overheads	0.00	50.85 \$/hour
Engineering Transportation	0.00	0.00 \$/hour
Total Removal Cost		0.00
J.P. Removal Cost from H.T. Co.		0.00
Payroll Tax		1696.00
TOTAL INSTALLATION & REMOVAL COST (Based on Labor Rates as of 11/1/00)		66,148.75

Less:

Joint Pole Credit	0.00	Use this value with RECAP
Salvage Credit	0.00	
Depreciation Credit	0.00	
60 Month Revenue Credit	0.00	
Total Credit	0.00	

NET TOTAL  
Cost Escalation 2.80 %

NET TOTAL WITH ESCALATION

- (1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs

0.00  
Sub Total 66,148.75  
GE Tax 4.17% 2,755.79  
68,904.51  
1,719.87  
Sub Total 67,868.62  
GE Tax 4.17% 2,827.41  
70,696.03

+ 1120 = 67,208.75  
(RECAP) Use this value with RECAP

COM-COMPANIES-SOP-IR-10  
EXAMPLE No. 2

recap

COST ESTIMATE RECAP SHEET

Date: 5/21/2003

Project:

By:

SUPERVISOR'S RATING: \_\_\_\_\_

Approved: \_\_\_\_\_

ACCOUNT	UNDERGROUND	OVERHEAD
Estimated Cost of Material, Labor, Transp. & Engineering	39,535.97	38,037.31
Service Connection Cost in Public R/W	7,141.00	5,513.00
Transformer Price Difference (Includes Material Overhead)	3,863.00	0.00
TOTAL COST	50,339.97	43,550.31
Less Credit for Equivalent Overhead	43,550.31	
	Subtotal 6,789.66	
	GE Tax 4.17% 282.86	
	7,072.52	
271 Non-refundable Contribution in Aid of Construction		
Total Overhead Credit from Above	**	43,550.31
Total Overhead Cost (Other than Credit)		0.00
Less OH Service Costs in Public R/W		5,513.00
Less 60 Months Estimated Revenue		0.00
	Subtotal	38,037.31
	GE Tax 4.17%	1,584.63
		39,621.94
252 Amount Applicable for Refundable Advance for Construction		
		48,894.48
TOTAL CUSTOMER'S CONTRIBUTION AND ADVANCE		
TOTAL COST (From Above)	50,339.97	43,550.31
Less Transformer Price Difference	3,863.00	0.00
Add Service Costs in Public R/W (OH only) & J.P. Credits	0.00	26,845.00
AUTHORIZATION AMOUNT (If Applicable—\$20,000)	46,876.97	70,395.31
	283	283

\*\* The Total U.G. Cost amount should be applied here if it is LESS than the OH figure.

MECO ESTIMATE

Date: 5/21/2003  
Time: 3:40 PM

Overhead  
XX Underground

By:                     

Approved:                     

Project Name:                     

Req No.: M000866

Supervisor's Rating:             

INSTALLATION

Direct Material .....	7,836.66		
Indirect Material .....	862.03	11.00 %	
Construction Labor .....	7,007.70		
Indirect Labor .....	9,198.00	43.80 \$/hour	
Construction Transportation .....	0.00	0.00 \$/hour	
Outside Material .....	0.00	11.00 %	
Contract Services (1&2) .....	250.00		
<b>Subtotal .....</b>	<b>25,154.39</b>		
Engineering (3) .....	5,059.38	31.82 \$/hour	
Engineering Overheads .....	8,236.20	51.80 \$/hour	
Engineering Transportation .....	0.00	0.00 \$/hour	
J.P. Installation Cost from H.T. Co. ....	0.00		
<b>Total Installation Cost .....</b>			<b>38,449.97</b>

REMOVAL

Construction Labor .....	0.00		
Indirect Labor .....	0.00	43.80 \$/hour	
Construction Transportation .....	0.00	0.00 \$/hour	
<b>Subtotal .....</b>	<b>0.00</b>		
Engineering .....	0.00	31.82 \$/hour	
Engineering Overheads .....	0.00	51.80 \$/hour	
Engineering Transportation .....	0.00	0.00 \$/hour	
<b>Total Removal Cost .....</b>			<b>0.00</b>
J.P. Removal Cost from H.T. Co. ....			<b>0.00</b>
<b>Payroll Tax .....</b>			<b>1088.00</b>
<b>TOTAL INSTALLATION &amp; REMOVAL COST</b>			<b>39,535.97</b>
(Based on Labor Rates as of 11/1/00)			

Less:

Joint Pole Credit .....	0.00	Use this value with RECAP
Salvage Credit .....	0.00	
Depreciation Credit .....	0.00	
60 Month Revenue Credit .....	0.00	
<b>Total Credit .....</b>	<b>0.00</b>	

NET TOTAL

Cost Escalation .....

NET TOTAL WITH ESCALATION

<b>Sub Total</b>	<b>39,535.97</b>	Use this value with RECAP
GE Tax 4.17%	1,647.07	
	<b>41,183.04</b>	
1,027.94		
<b>Sub Total</b>	<b>40,583.91</b>	Use this value with RECAP
GE Tax 4.17%	1,689.89	
	<b>42,253.80</b>	

(1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs  
Form: 11/24/88  
REV 2/3/03

MECO ESTIMATE

Date: 5/21/2003  
Time: 2:51 PM

XX Overhead  
\_\_\_ Underground

By:                     

Approved:                     

Project Name:                     

Req No.: M0009856

Supervisor's Rating:           

INSTALLATION

Direct Material.....	12,813.80		
Indirect Material.....	1,408.52	11.00 %	
Construction Labor.....	9,110.01		
Indirect Labor.....	11,957.40	43.80 \$/hour	
Construction Transportation.....	0.00	0.00 \$/hour	
Outside Material.....	0.00	11.00 %	
Contract Services (1&2).....	9,508.00		
Subtotal.....	44,788.73		
Engineering (3).....	5,059.38	31.82 \$/hour	
Engineering Overheads.....	8,236.20	51.80 \$/hour	
Engineering Transportation.....	0.00	0.00 \$/hour	
J.P. Installation Cost from H.T. Co.....	0.00		
Total Installation Cost.....			58,094.31

REMOVAL

Construction Labor.....	0.00		
Indirect Labor.....	0.00	43.80 \$/hour	
Construction Transportation.....	0.00	0.00 \$/hour	
Subtotal.....	0.00		
Engineering.....	0.00	31.82 \$/hour	
Engineering Overheads.....	0.00	51.80 \$/hour	
Engineering Transportation.....	0.00	0.00 \$/hour	
Total Removal Cost.....			0.00
J.P. Removal Cost from H.T. Co.....			0.00
Payroll Tax.....			1275.00
TOTAL INSTALLATION & REMOVAL COST (Based on Labor Rates as of 11/1/00)			59,369.31

Less:

Joint Pole Credit.....	21,332.00	Use this value with RECAP
Salvage Credit.....	0.00	
Depreciation Credit.....	0.00	
60 Month Revenue Credit.....	0.00	
Total Credit.....	21,332.00	

NET TOTAL

Cost Escalation..... 2.60 %

Sub Total	38,037.31	Use this value with RECAP
GE Tax 4.17%	1,584.63	
	39,621.94	
	988.97	
Sub Total	39,026.26	Use this value with RECAP
GE Tax 4.17%	1,625.83	
	40,652.11	

NET TOTAL WITH ESCALATION

(1) Includes Easement Costs  
(2) Includes Tree Trimming Costs  
(3) Includes Land Agent Costs  
Form: 11/24/86  
REV 2/3/03

COM-Companies-SOP-IR-11

Page 22, Avoided Utility System Costs: Provide the most recent estimates by MECO of the cost of providing new peaking generating facilities to meet increases in peak demand, and the cost of providing new baseload or combined cycle generating facilities to meet increases in baseload requirements.

HECO Response:

The next baseloaded generating unit to be added to the Maui electrical grid in accordance with its IRP-2 Plan is Maalaea 18 (M18), a nominal 18 MW steam turbine generator. M18 is targeted for commercial operation in September 2006 and will complete the Maalaea Dual-Train Combined Cycle No. 2 Plant. Maalaea 17 and M19, two nominal 20 MW combustion turbines, were installed previously and have been operating in peaking status awaiting conversion to combined cycle operation with the installation of M18. The estimated capital cost for M18 including escalation and AFUDC in 2006 dollars is \$43.5 million.

The next generating unit to be added to the Maui electrical grid in accordance with its IRP-2 Plan is Waena 1(W1), a nominal 20 MW combustion turbine. W1 is targeted for commercial operation in 2010. The estimated capital cost for W1 including escalation and AFUDC in 2010 dollars is \$70.5 million.

COM-Companies-SOP-IR-12

Page 22, Avoided Utility System Costs: Provide the most recent marginal cost of service study prepared on the MECO system showing marginal generation, transmission, and distribution capacity costs, and marginal energy costs.

HECO Response:

The latest marginal cost study prepared for MECO was filed in MECO's last rate case, Docket No. 97-0346. Please see the exhibit from that proceeding, attached as pages 2-5.

MECO-1708  
DOCKET NO. 97-0346  
PAGE 1 OF 4  
(REVISED 4-3-98)

CAPACITON

MAUI ELECTRIC COMPANY, LIMITED  
Summary of 1999 Time-Differentiated Marginal Costs  
MAUI DIVISION

Voltage Level	Annual Per KW Costs			Monthly Marginal Costs		
	Priority Peak	Shoulder	Off-Peak	Priority Peak	Shoulder	Off-Peak
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Secondary Service:</b>						
Monthly Capacity Costs (1999 Dollars Per kW)						
Generation	\$180.94	\$30.19	\$0.00	\$15.08	\$2.52	\$0.00
Transmission	\$27.76	\$4.63	\$0.00	\$2.31	\$0.39	\$0.00
Distribution Substation	<u>\$23.42</u>	<u>\$2.01</u>	<u>(\$0.00)</u>	<u>\$1.95</u>	<u>\$0.17</u>	<u>(\$0.00)</u>
TOTAL	\$232.12	\$36.83	\$0.00	\$19.34	\$3.07	\$0.00
Distribution Facilities	\$32.00	\$32.00	\$32.00	\$2.67	\$2.67	\$2.67
Energy Costs (1999 cents per kWh)				5.43	5.27	4.93
<b>Primary Service:</b>						
Monthly Capacity Costs (1999 Dollars Per kW)						
Generation	\$179.46	\$29.95	\$0.00	\$14.96	\$2.50	\$0.00
Transmission	\$27.54	\$4.59	\$0.00	\$2.29	\$0.38	\$0.00
Distribution Substation	<u>\$23.22</u>	<u>\$1.99</u>	<u>(\$0.00)</u>	<u>\$1.94</u>	<u>\$0.17</u>	<u>(\$0.00)</u>
TOTAL	\$230.22	\$36.53	\$0.00	\$19.19	\$3.04	\$0.00
Distribution Facilities	\$23.00	\$23.00	\$23.00	\$1.92	\$1.92	\$1.92
Energy Costs (1999 cents per kWh)				5.33	5.19	4.88
<b>Transmission Service:</b>						
Monthly Capacity Costs (1999 Dollars Per kW)						
Generation	\$170.80	\$28.50	\$0.00	\$14.23	\$2.38	\$0.00
Transmission	<u>\$26.21</u>	<u>\$4.37</u>	<u>\$0.00</u>	<u>\$2.18</u>	<u>\$0.36</u>	<u>\$0.00</u>
TOTAL	\$197.01	\$32.87	\$0.00	\$16.42	\$2.74	\$0.00
Energy Costs (1999 cents per kWh)				4.87	4.79	4.63

SOURCE: Col. (1)-(3): Generation costs are Total Combustion Turbine Cost times the Generation Cost Assignment Factor times the Energy Loss Factor for each level. Transmission costs are Total Transmission Cost times Energy Loss Factor times the System Probability of Peak for each rating period.  
Col. (4)-(6): Monthly costs are the annual costs divided by the number of months (12).

MECO-1708  
DOCKET NO. 97-0346  
PAGE 2 OF 4

FILE: CUSTSUM

MAUI ELECTRIC COMPANY, LIMITED  
COMPUTATION OF CUSTOMER-RELATED UNIT COSTS  
Maui Division 1999

	Residential (Secondary Service)	General (Non Demand Service)	General (Demand Service)	Commercial Cooking, Heating, etc.	Industrial (Large Power)	Public & Street Lighting	
						(Metered)	(Unmetered)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1999 Dollars Per Customer)							
(1) Meter Investment	\$101.98	\$211.63	\$366.24	\$282.91	\$1,847.67	\$163.38	\$0.00
(2) With General Plant Loading (1) x 1.0479	\$106.86	\$221.76	\$383.77	\$296.44	\$1,936.08	\$171.20	\$0.00
(3) Annual Economic Charge Related to Capital Investment	9.39%	9.39%	9.39%	9.39%	9.39%	9.39%	9.39%
(4) A&G Loading	0.54%	0.54%	0.54%	0.54%	0.54%	0.54%	0.54%
(5) Total (3) + (4)	9.93%	9.93%	9.93%	9.93%	9.93%	9.93%	9.93%
(6) Annualized Costs (2) x (5)	\$10.61	\$22.02	\$38.11	\$29.44	\$192.25	\$17.00	\$0.00
(7) Services Investment	\$235.76	\$288.39	\$364.44	\$346.51	\$1,066.93	\$235.76	\$248.17
(8) With General Plant Loading (7) x 1.0479	\$247.04	\$302.19	\$381.88	\$363.09	\$1,117.99	\$247.04	\$260.05
(9) Annual Economic Charge Related to Capital Investment	9.39%	9.39%	9.39%	9.39%	9.39%	9.39%	9.39%
(10) A&G Loading	0.54%	0.54%	0.54%	0.54%	0.54%	0.54%	0.54%
(11) Total (9) + (10)	9.93%	9.93%	9.93%	9.93%	9.93%	9.93%	9.93%
(12) Annualized Costs (8) x (11)	\$24.53	\$30.01	\$37.92	\$36.06	\$111.03	\$24.53	\$25.83
(13) Meter O&M Expenses	\$12.35	\$23.44	\$44.08	\$34.08	\$222.63	\$12.35	\$0.00
(14) Service O&M Expenses	\$1.88	\$2.30	\$3.00	\$2.77	\$8.52	\$1.88	\$1.88
(15) Customer Accounts, Customer Service and Informational and Sales Expenses	\$44.33	\$60.50	\$107.83	\$61.22	\$136.83	\$39.25	\$39.25
(16) With A&G Loading [(13)+(14)+(15)] x 1.4331	\$3.93	\$26.45	\$22.03	\$140.55	\$27.37	\$6.65	\$8.96
(17) Customer-Related Cost (6) + (12) + (16)	\$19.07	\$178.48	\$298.06	\$206.04	\$300.63	\$118.19	\$44.78
Working Capital							
(18) Materials and Supplies [(2)+(8)] x 2.87% ^1	10.14	15.02	21.94	18.90	87.53	11.99	7.45
(19) Prepayments [(2)+(8)] x 0.06% ^1	0.21	0.31	0.46	0.40	1.83	0.25	0.16
(20) Cash Working Capital (16) x 0.07% ^2	0.06	0.09	0.15	0.10	0.37	0.05	0.04
(21) Revenue Requirement for Working Capital [(18)+(19)+(20)] x 13.38% ^3	1.39	2.06	3.02	2.60	12.01	1.64	1.02
(22) Total Customer-Related Costs (17) + (21)	120.46	180.54	301.08	208.64	\$42.66	\$119.83	\$5.80
(23) Total Marginal Cost (Rounded)	<u>\$120</u>	<u>\$181</u>	<u>\$301</u>	<u>\$209</u>	<u>\$843</u>	<u>\$120</u>	<u>\$86</u>

SOURCE: Lines (1),(7):  
Lines (2),(8):  
Lines (3),(9):  
Lines (4),(10):  
Line (13):  
Line (14):  
Line (15):  
  
Lines (18),(19):

Based on typical installed costs. See worksheet (MTRASERV).  
See worksheet for General Plant Loading Factor.  
See worksheet for Economic Carrying Charge.  
See worksheet for A&G Loading Factor.  
See worksheet for "Meter O&M Expenses by Customer Class" (MTR&MP2).  
See worksheet for "Service O&M Expenses by Customer Class" (SERO&MP2).  
See worksheet for "Customer Accounts Expenses by Customer Class" (CUSACCP2) and "Customer Service and Information Expenses by Customer Class" (SVCINFP2).  
See worksheet for Materials & supplies, and Prepayments Loading Factors (M&S&PRE).



MECO-1708  
DOCKET NO. 97-0346  
PAGE 3 OF 4  
(REVISED 4-3-98)

MAUI ELECTRIC COMPANY, LIMITED  
TEST YEAR 1999 DOCKET NO. 97-0346  
MAUI DIVISION

COMPARISON BETWEEN UNIT EMBEDDED COSTS  
UNIT MARGINAL COSTS

	Embedded Full Cost	Marginal Cost <sup>1</sup>
<u>Demand Costs</u>	<u>(\$/kw/month)</u>	<u>(\$/kw/month)</u>
Production	\$13.66	\$17.60
Transmission	\$3.01	\$2.70
Distribution <sup>2</sup>	\$2.47	\$4.79
Total	\$19.14	\$25.09
<u>Energy Costs</u>	<u>(¢ / kwh)</u>	<u>(¢ / kwh)</u>
Priority Peak	N/A	5.43
Shoulder Peak	N/A	5.29
Off-Peak	N/A	4.93
Total	5.57	5.16
<u>Customer Costs</u>	<u>(\$/customer/month)</u>	<u>(\$/customer/month)</u>
Schedule R	\$20.64	\$10.00
Schedule G	\$30.80	\$15.08
Schedule J	\$66.75	\$25.08
Schedule H	\$89.51	\$17.42
Schedule P	\$363.30	\$70.25
Schedule F	\$385.47	\$10.00

<sup>1</sup>At Secondary Voltage Level

<sup>2</sup> Marginal distribution substation and marginal distribution facilities costs.

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MAUI ELECTRIC COMPANY, LIMITED  
TEST YEAR 1999 DOCKET NO. 97-0346  
MAUI DIVISION

EMBEDDED FULL COST-BASED CLASS REVENUE REQUIREMENTS  
VS. MARGINAL COST-BASED CLASS REVENUES

Rate Class	Embedded Full Cost (\$000s)	Marginal Cost (\$000s)	Difference (\$000s)	Percent (%)
R	\$62,407.2	\$81,867.4	(\$19,460.2)	-31.2%
G	\$14,087.5	\$12,980.1	\$1,107.4	7.9%
J	\$29,457.3	\$28,694.5	\$762.8	2.6%
H	\$4,048.0	\$3,528.2	\$519.8	12.8%
P	\$39,358.7	\$35,146.6	\$4,212.1	10.7%
F	<u>\$1,230.9</u>	<u>\$651.6</u>	<u>\$579.3</u>	<u>47.1%</u>
Total	\$150,589.6	\$162,868.3	(\$12,278.7)	-8.2%

COM-Companies-SOP-IR-13

Page 22, Avoided Utility System Costs: Provide any studies done by MECO of the generation, transmission, and distribution capacity cost savings that may be achieved through the use of distributed renewable resources in the residential sector, such as solar water heating systems or storage water heating system, including any analysis of the benefits of timers or interruptibility of these systems.

HECO Response:

The most recent analysis is provided in MECO's IRP-2 Evaluation Report, filed on April 30, 2004.

The analysis in Section 5 on pages 47 to 52 shows that 20-year total resource costs are reduced when energy efficiency DSM programs (which include solar water heating systems) and load management DSM programs (which include interruptible loads) are included in the resource plan.

COM-Companies-SOP-IR-14

Page 30, Recovery of Standby Demand Costs from DG Owners: Provide the most recent fully allocated cost of service study prepared by MECO, and the most recent cost of service study for the MECO system prepared by any other party to a MECO rate proceeding, including any associated workpapers showing the inter-island and/or inter-class subsidies that MECO and other parties believe are reflected in current MECO rates.

HECO Response:

Please see HECO response to LOL-SOP-IR-70.

COM-Companies-SOP-IR-15

Page 38, Sole Sourcing to Hess: Do other manufacturers or vendors offer CHP systems that are skid-mounted, pre-wired, pre-piped, factory-tested and UL approved that are substantially equivalent to those offered by Hess?

HECO Response:

Other manufacturers offer skid-mounted CHP systems, however, Hess Microgen is the only manufacturer known to the Companies to offer UL approval on the entire CHP system.

COM-Companies-SOP-IR-16

Page 38, Sole Sourcing to Hess: Provide any analysis done by the Companies in determining to sole-source its offering to Hess.

HECO Response:

No formal analysis was done, however, the Companies considered Hess' leadership in implementing CHP projects in Hawaii which, combined with Hess' capabilities that are described in the Companies' preliminary SOP and CHP Program application (pages 45-48), led to this decision. As described in the preliminary SOP, the Companies do not consider the Hess agreement to be a sole-source offering.

COM-Companies-SOP-IR-17

Page 39, Sole Sourcing to Hess: Provide a list of the "circumstances where the standard Hess Microgen offering does not meet the needs of the customer" and sufficient discussion of each to understand what the issues were for that customer.

HECO Response:

The two most common circumstances that may arise are (1) the electrical loads of the customer cannot be efficiently met by Hess equipment, such as if the loads are very large, and (2) there are special facility needs that cannot be provided by a packaged Hess system, such as where a containerized CHP system is preferable to a skid-mounted system.

COM-Companies-SOP-IR-18

Page 28, Interconnection: Provide a list of all known existing customer-owned generation that is synchronous to the MECO system, indicating the size of each generating unit, the fuel type, heat rate (if known), whether stand-alone or CHP, and location on the system.

HECO Response:

There are three known existing customer-owned generation that is synchronous to the MECO system.

The information requested is as follows:

Name	Nameplate Capacity, Gross MW	Primary Fuel Type	Heat Rate	Type	Location
Hawaiian Commercial & Sugar	63	Bagasse	Unknown	CHP	Puunene
Maui Land & Pine	6.55	Diesel	9858 btu/kwh HHV	CHP*	Kahului
Customer CHP**	0.44	Propane	Unknown	CHP	Kaanapali

\* Waste heat not used.

\*\* Customer name is confidential. See MECO's latest Rule 14.H Quarterly Status Report filed April 30, 2004, Docket No. 02-0051.